EPA/ROD/R04-93/155
1993

EPA Superfund
Record of Decision:

FCX, INC. (WASHINGTON PLANT)
EPA ID: NCD981475932
OU 01
WASHINGTON, NC
09/15/1993

RECORD OF DECISION

FOR FCX, INC. SUPERFUND SITE

WASHINGTON, BEAUFORT COUNTY,
NORTH CAROLINA

September 15, 1993

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

FCX WASHINGTON SITE WASHINGTON,
BEAUFORT COUNTY, NORTH CAROLINA

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the FCX Washington Site in Washington, Beaufort County, North Carolina, chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Contingency Plan (NCP). This decision is based on the administrative record file for this Site.

The State of North Carolina concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

This remedy addresses the principle threat of contaminated groundwater emanating from beneath the Site.

The major components of the selected remedy include:

GROUNDWATER

Extraction of groundwater at the Site that is contaminated above Maximum Contaminated Levels or the North Carolina Groundwater Standards, whichever is more protective;

Onsite treatment of extracted groundwater via air stripping; carbon adsorption; precipitation; and ion exchange;

Discharge treated groundwater to surface water.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial

action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technology to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element. Since this remedy may result in hazardous substances remaining onsite above health based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

TABLE OF CONTENT

DECISION SUMMARY

I. SITE NAME, LOCATION AND DESCRIPTION

A. Introduction

The FCX Washington Site (hereinafter referred to as the "FCX Site" or the "site") is defined as an area located on the western edge of Washington, North Carolina, in which soil, sediment, surface water, and groundwater are contaminated by multiple sources. Previous investigations have indicated that the former Farmers Cooperative Exchange (FCX) Inc. facility, comprised of seven tracts of land, is one of the major sources of concern. This facility acted as a farm supply distribution center which repackaged and sold pesticides, herbicides, and tobacco treating chemicals from 1945 to 1985. Five source areas of contamination related to these pesticide handling and disposal practices have since been identified in this area.

B. Site Description

The FCX Site is located approximately 1.5 miles northwest of and within the city limits of Washington, North Carolina, in west central Beaufort County (see Figure 1-1). The site covers approximately 12 acres and is bounded on the northeast by the intersection of Grimes Road (SR 1402) and Whispering Pine Road (SR 1404), Mount Pleasant Canal to the east, wetlands leading to Kennedy Creek and Tar River to the south and southwest, and agricultural land to the west-northwest (see Figure 1-2). A site features map showing the approximate locations and limits of the warehouse, main chemical burial trench, blending building, and known features is provided in Figure 1-3.

Source area 1 is located between Grimes Road and the farmland, approximately 230 yards north-northwest of the former FCX warehouse, and is comprisedprimarily of several small to medium office/storage buildings and silos/tanks associated with the W.B. Gerard & Sons Inc. fertilizer and hardware company located at 425 Grimes Road. This source area is located on relatively flat terrain which has a gradual slope to the south and southwest. In addition, a man-made drainage ditch, located parallel and south of Grimes Road borders this source area to the northeast. This man-made drainage ditch also borders both source areas 2 and 3 to the

northeast. Surface water in this ditch flows in a southeasterly direction prior to its confluence with the Mt. Pleasant Canal northwest of the Cleon Lathan residence (source area 3).

The deed search conducted as part of a PRP search indicates that source area 1 once belonged to FCX (Techlaw, 1988). Current operations at this source area by W. B. Gerard & Sons Inc. includes the distribution of agrochemicals.

Source area 2 is located between Grimes Road and the farmland located 115 yards north-northwest of the former FCX warehouse. The significant site features of source area 2 include a large warehouse building and a gravel parking lot associated with the Charlie Tom's Restaurant & Oyster Bar (the former FCX blending building). A surface water drainage ditch originates in the southwest corner of source area 2, and water in this ditch flows in a southeasterly direction parallel to the southwest property line and the abandoned Seaboard Coastline Railroad Spur. This drainage ditch discharges into Mt. Pleasant Canal near the Cleon Lathan residence.

Source area 3 is located between Grimes Road and the farmland located west of the former FCX warehouse and 50 yards north-northeast of this warehouse. Mount Pleasant Canal forms the eastern border of source area 3. The significant site features of this source area include a large warehouse building located in the northern portion of the source area, and the Cleon Lathan residence located in the southern portion of the source area, adjacent to the Mt.

Pleasant Canal. At the time of the RI field investigation, residents occupied the large warehouse. Several small depressions/drainage ditches are also located in the center of source area 3 which divert surface water runoff northeast towards the drainage ditch parallel to Grimes Road. Source area 3 also contains a former loading dock (concrete ramp), several concrete grain silo support pads located south of and adjacent to the large warehouse building, and a secondary access road parallel to the abandoned Seaboard Coastline Railroad Spur. The access road connects the southwest corner of source area 2 (Charlie Tom's parking lot) with the paved entrance road to the Cecil Campbell Trucking Company (old FCX warehouse).

Source area 4 is located between source area 3 and source area 5. It consists of the Cecil Campbell Trucking Company warehouse (the old FCX warehouse), a paved entrance and parking lot located south of the warehouse, existing grain storage silos, a former grain storage silo, concrete support pads on the southwest corner of the warehouse, and secondary access roads that surround the warehouse to the north, west, and south. The Mt. Pleasant Canal borders source area 4 to the southeast. Water in a small surface drainage ditch originating at the former silo concrete support pad flows in a southeasterly direction between source areas 4 and 5, and discharges into Mt. Pleasant Canal near the waste stockpile (source area 5). In the southern part of source area 4 is a monitor well (WMW-1) which is located adjacent to the warehouse. This well was installed by Westinghouse.

Source area 5 is located south-southeast of source area 4, and north-northwest of a small agricultural field and the wetlands. The Mount Pleasant Canal borders source area 5 to the southeast. Located in this area are the excavated and backfilled main chemical burial trench, and the fenced contaminated pesticide waste stockpile. A small concrete block retaining wall and gravel pad where above ground storage tanks once existed, are located on the southwest corner of the fenced stockpile area. In the southeast part of source area 5 are three monitor wells (WMW-2, WMW-3, and WMW-4) which are located along the border between source area 5 and the small agricultural field. These wells were installed by Westinghouse.

C. Demography and Land Use

The city of Washington with an estimated population of 9,075 is located within a four-mile radius of the site. Additionally, there are four minor population centers located within a four mile radius of the site. These population centers include Washington Park centered three miles southeast of the site, Chocowinity centered four miles south-southwest of the site, Hootentown centered 3.5 miles east-southeast of the site, and Wharton Station centered 3.9 miles northwest of the site. Washington Park has an estimated population of 403 and Chocowinity has an estimated population of 624, based on 1990 census results. Demographic information was not available for Hootentown and Wharton Station which are unincorporated. Current land use around the site is primarily light industrial, commercial, residential, and agricultural. Agricultural fields surround the site to the north, west, southeast, and southwest. A 275-acre freshwater wetlands is located further to the south and southwest of the site. The former abandoned city dump is located within these wetlands. Industries in the area include distribution centers for trucking, agro-chemical, propane, and manufacturing companies related to the textile industry. Commercial operationsinclude a restaurant, grocery store, retail lumber and hardware store, day care nursery, barber shop, automobile parts store, insurance sales office, and a D.O.T. office located on Grimes Road north of the site.

Residential neighborhoods are interspersed within the light industrial/commercial areas which line the main roads within a three-mile radius of the site. Approximately 11,350 residents are estimated to live within a three-mile radius of the site. As previously mentioned, two structures including the large warehouse building and the Cleon Lathan residence located in source area 3 are inhabited.

Recreational areas near the FCX Site include a public swimming pool located on Grimes Road and a little league baseball field located east of the National Spinning Company. Tranters Creek, Kennedy Creek, Tar River, and Pamlico River are used occasionally for fishing and swimming purposes. Kennedy Creek, Tar River, and Pamlico River are classified for secondary recreation, indicating waters of lower quality (WPB, 1990).

The population in the vicinity of the site obtains its potable water supply from either public water supply wells or from private wells. Industrial production wells are also located in the vicinity of the site.

D. Geology

Three distinct lithostratigraphic units were penetrated during the subsurface investigation. They include the surficial undifferentiated sediments, the Yorktown Formation, and the upper portion of the Castle Hayne Limestone.

Directly beneath the site lies the surficial undifferentiated sediments which are comprised of unconsolidated sand, silt, and clayey sand of Quaternary age. For the most part, the dominant lithology of the surficial unit is a fine to coarse grained quartz sand. Locally, within stream basins, these deposits have been chemically and mechanically eroded into alluvium. Thesealluvial deposits mantle deeper marine and non-marine sediments along surface waters. The thickness of surficial sediments underlying the site ranges from 9 feet at MW-03 to 17 feet at MW-06, and averages 12.3 feet. In addition to naturally occurring deposits, there are localized zones where clean soil material was used to fill low lying or excavated areas at the site.

Below the surficial deposits are the sediments of the Yorktown Formation. Based on existing well log data, surficial sediments gradually interfinger with sediments of the Yorktown Formation.

The contact between these two units was determined from lithological variations observed in split spoon soil samples and is delineated by a near surface clay unit. This clay marks the top of the Yorktown Formation and was encountered at depths ranging from 9 to 17 feet bls. The Yorktown Formation underlying the site consists of: an upper sandy, shelley, clay; and intermediate shelley, sand; and a lower sandy clay. The thickness of the upper sandy, shelley, clay varies from 6 feet at MW-06 to 12 feet at MW-02. The intermediate shell and sand unit varies in thickness from 16 feet at MW-02 to 28 feet at MW-01. The deeper sandy clay unit varies in thickness from 14 feet at MW-14 to 23 feet at MW-08. Overall, the Yorktown Formation varies from 40 feet at MW01 to 42 feet at MW-08.

E. Hydrogeology

The FCX Site is underlain by seven aquifers. They include a surficial (water table) aquifer and six deeper semi-confined to confined aquifers. A more formal designation of these aquifer systems in order of increasing depth is as follows:

- Surficial/water table aquifer
- Yorktown aquifer
- Castle Hayne aquifer
- Beaufort aquifer
- Peedee aquifer
- Black Creek aquifer
- Cape Fear aquifer

The water table or surficial aquifer is comprised of undifferentiated surficial sands of recent age. The thickness of the water table aquifer ranges from 2.0 feet at MW-03 to 8.0 feet at MW-06, and averages 4.6 feet. Underlying the water table aquifer is the Yorktown aquifer. The Yorktown aquifer is semi-confined and is separated from the water table aquifer by the upper clayey sediments of the Yorktown Formation. This clay is formally designated as the upper Yorktown semi-confining unit and is continuous throughout the site area. The thickness of the upper Yorktown semi-confining unit ranges from 6 to 12 feet, and averages 9 feet. Below this upper semi-confining unit are the permeable sediments that comprise the Yorktown aquifer. These sediments consist primarily of shells and sand. The saturated thickness of the Yorktown aquifer ranges from 16 to 27 feet, and averages 23 feet. The base of the Yorktown aquifer is formed by the clays of the Yorktown Formation and of the Castle Hayne Limestone. Formally this clay unit is designated as the Castle Hayne confining unit (Winner and Coble, 1989). Only the upper portion of the Castle Hayne confining unit was penetrated during the RI subsurface investigation, and therefore its exact thickness below the FCX Site is not known. Based on site lithologic data, it is known that the Castle Hayne confining unit is at least 38 feet thick. The Yorktown aquifer is the deepest aquifer that was penetrated during the subsurface investigation.

The deeper aquifer systems underlying the Yorktown aquifer are important from a hydrogeological perspective. However, they are unaffected by the site. As a result, these systems are not discussed in this document. Additional information on these systems is available in the Remedial Investigation report.

F. Climate/Meteorology

The climate is moderate with warm and humid summers, and calm winters. Summers are long and quite warm, with afternoon temperatures averaging 90 F. approximately 33% of the midsummer days, and with sea breezes generally occurring around noon to alleviate the inland heat. During winter, numerous polar air masses reach the middle Atlantic Coast causing sharp drops in temperatures. The temperature, however, rarely falls below freezing. The average annual temperature for the period 1945-1982 is 63 F (NOCD, 1986).

Rainfall is generally evenly distributed throughout the year with the driest weather usually occurring in the spring and the wettest weather occurring in the summer. Summer rainfall comes principally from thunderstorms which occur one out of every three to four days during the summer. Winter rain is generally a slow, steady rain or drizzle only lasting one or two days. Seldom is there a winter without a few flakes of snow. However, several years may pass without a measurable amount.

II SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. Site History

The FCX facility operated a farm supply distribution center which repackaged and sold pesticides, herbicides, and tobacco treating chemicals from 1945 to 1985. From 1960 to 1981, an unknown amount of chemical waste in plastic containers and paper bags, generated by FCX, was buried in an on-site landfill located in source area 5, southwest of the former FCX warehouse (NCDHR, 1987).

Since mid-1986 to date, several site investigations have been performed at the FCX Site. Sampling studies have been conducted by local, state, and federal agencies, as well as private consultants to FCX Inc. and Fred Webb, Inc. These previous site investigations, however, have been primarily limited to source areas 2 and 5 of the former FCX facility (see Figure 1-3). In September 1990, EPA initiated this Remedial Investigation/Feasibility Study (RI/FS) to address

all potential source areas and associated contamination at the FCX Site.

B. Summary of Previous Investigations

In July of 1986, a preliminary assessment of the FCX Site was prepared by the North Carolina Department of Human Resources (NCDHR). This preliminary assessment indicated that pesticides, in the form of toxic powder and liquid wastes, were buried on-site, and a potential for groundwater, soil, and drinking water contamination existed. The report recommended that a site investigation be performed.

The FCX Site was inspected by the NCDHR, Solid and Hazardous Waste Management Branch, on August 26, 1986. Chemical analyses revealed the presence of aldrin, dieldrin, chlordane, DDT, DDE, DDD, hexachlorobenzene, carbon disulfide, naphthalene, phenanthrene, acenaphthylene, fluorene, dibenzofuran, 2-methylnaphthalene, and mercury at measurable concentrations. No volatile organic, semi-volatile organic, pesticide, or metal contamination was revealed in any of the five groundwater samples collected. Ambient air monitoring during the site inspection using an HNu did not detect volatile organic compounds (VOCs) above background levels. In May of 1987, FCX Inc. employed the resources of Rose and Purcell, Inc., and GSX, Inc., to study the on-site contamination and clear the chemical warehouse located in source area 4. Chemical analysis of one soil sample collected by GSX in the vicinity of the main chemical burial trench revealed the presence of toxaphene at a concentration of 2400 milligrams/kilogram (mg/kg) and copper at a concentration of 480 mg/kg, among other contaminants (McLaughlin, 1987).

August of 1988, EPA Region IV's technical assistance team (TAT) conducted a site reconnaissance sampling investigation. An electromagnetic survey(EM-31) and a magnetic survey were used to identify the boundaries of the chemical burial trenches located in source area 5 (TAT, 1989). Soil samples collected near the main chemical burial trench during the 1988 sampling investigation revealed the presence of elevated concentrations of DDD, DDE, DDT, AlphaChlordane, Gamma-Chlordane, Dieldrin, Phenol, Heptachlor Methoxychlor.

In January of 1989, EPA conducted a removal action at the site was initiated in which approximately 3000 cubic yards (cy) of contaminated soil was excavated from the main chemical burial trench located in source area 5. The soil was stockpiled within a secured area in the southern corner of this source area (TAT, 1989).

Additionally, in 1990, TAT collected soil samples from the area surrounding the former FCX blending building (Charlie Toms Restaurant & Oyster Bar) located in source area 2 (see Figure 1-5). Subsequently in late January, an additional 49 cy of contaminated soil was excavated from the area surrounding the former FCX blending building. This removed waste was consolidated with the previously removed waste located in source area 5 (TAT, 1991).

In association with the 1990 TAT sampling investigation and subsequent removal action activities at the site, additional soil sampling in source area 2 revealed the presence of pesticides, volatile organics, and semivolatile organics at elevated concentrations (TAT, 1991).

In July of 1990, in response to a report that the permalon liner covering the contaminated soil stockpile was torn, EPA constructed a temporary containment berm around the waste stockpile to prevent potential contamination runoff, and repaired the torn liner (TAT, 1991). During this operation, additional buried material located two feet below ground surface (with a total pesticides concentration of 103 mg/kg) was identified at the northern corner of the stockpile (TAT, 1991). In August of 1990, a groundwater sampling investigation in the vicinity of the former warehouse and chemical burial trench was performed by Westinghouse Environmental and Geotechnical Services, Inc. for Fred Webb Grain, Inc. Four 2-inch stainless steel wells were installed in source areas 4 and 5. Analyses of groundwater samples collected from the

Westinghouse wells revealed elevated levels of endrin, 4,4 DDD.

C. Enforcement Activities

The FCX Site was listed on the National Priority List in March of 1989.

In October and November of 1988, the EPA and the State of North Carolina joined in legal action to secure the remaining assets of the bankrupt FCX Corporation prior to their disbursement to the investors. The proceedings occurred within the Federal Bankruptcy Court in Raleigh, North Carolina. In July 14, 1992 a Trust Agreement was entered, which provided that FCX could not abandon the property at the FCX-Washington Site and that a portion of the remaining assets were to be divided between the FCX-Washington Site and the FCX Statesville Site. The actual allocation for the FCX Washington Site was $1,750,000.00.

In March 30, 1992 the Agency entered into a consent decree with Fred Webb Inc. The settlement was for $540,000.00, to be paid over a five year period.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

Pursuant to CERCLA 113(K)(2)(B)(i-v) and 117, the RI/FS Report and the Proposed Plan for the FCX Washington Site were released to the public for comment on April 20, 1993. These documents were made available to the public in the administrative record located in the information repository maintained at the EPA Docket Room in Region IV and at the Brown Library in Washington, North Carolina.

The notice of availability for these documents was published in theWashington Daily News and the Daily Reflector on April 20, 1993. A public comment period on the documents was held from April 20, 1993 to June 18, 1993. A copy of the notice was mailed to the public. In addition, a public meeting was held on May 4, 1993. At this meeting, representatives from EPA answered questions about problems at the Site and the remedial alternatives under consideration.

Other community relations activities included;

- Community Relations Plan finalized on February 6, 1991 and a copy was placed in the information repository.
- Issuance of a Fact Sheet on the RI/FS process in September 1991.
- Public meeting on October 3, 1991, to discuss the superfund process. The meeting was announced by a display ad that appeared in the newspapers on September 26, 1991
- Public notice was mailed to citizens informing them that EPA was beginning the second phase of removal activities at the Site.
- Issuance of a Fact Sheet updating the RI/FS activities in December 1992.
- Issuance of a Fact Sheet on the Proposed Plan in April
- Proposed Plan Public Meeting for the ground water remediation held on May 4, 1993. The meeting was announced by display ad on April 20, 1993.
- Notice mailed to citizens and appeared in area newspaper on May 17 1993 announcing 30-day extension of public comment period which was extended until midnight June 18, 1993.

IV. SCOPE AND ROLE OF RESPONSE ACTION WITHIN SITE STRATEGY

The FCX Washington Site has been divided into units or phases, referred to as "operable units". The operable units (OUs) at this Site are:

OU One: Contaminated ground water.

OU Two: Residual Soil Contamination.

This approach was taken because the soil and source contamination are being addressed via a time-critical removal action that is presently taking place at the site. This removal action is expected to address all soil/source contamination to the point no further remediation is required.

V. SUMMARY OF SITE CHARACTERISTICS

The Remedial Investigation (RI) at the FCX Washington Site included the characterization of the following routes of contaminant migration: soil, groundwater, surface water and sediment contamination.

A. Soil Investigation

The Remedial Investigation included a thorough soil investigation that encompassed the sampling of soils within each of the source areas identified at the Site. The results of the investigation were used to facilitate the four stage removal action being conducted at the Site.

The actual removal of contaminated soil was conducted in three stages.

In January of 1990 2,200 cubic yards of pesticide contaminated soil and debris were excavated and stockpiled on Site.

In January of 1992 EPA excavated an additional 2,000 cubic yards of contaminated soil and added it to the existing stockpile.

The third stage of the removal action began in September of 1992, during which 3,110 cubic yards of the existing stockpile was bagged and placed in the on-site warehouse for storage, and an additional 11,600 cubic yards of contaminated soil was excavated and stockpiled on-site.

The fourth stage will consist of treatment of the contaminated soils stored on Site. Assessment of the soils is not given at this time because Site conditions were altered by the removal action subsequent to the Remedial Investigation. However, operable unit 2 (OU2) will be implemented upon the completion of the fourth stage of the removal action. OU2 will give a full accounting of the four stages of the removal action and a complete assessment of the Site soils post treatment.

B. Groundwater Investigation

Groundwater sampling was conducted at the FCX Site to fully assess the types and concentrations of contaminants present in the aquifer system, and to determine the extent and magnitude of groundwater contamination with regard to each of the source areas identified at the site.

A total of 18 monitoring wells (9 two-well clusters) were installed at the approximate locations shown in Figure 2-1 to supplement the 4 existing monitoring wells (WMW1 - WMW4) installed by Westinghouse Environmental and Geotechnical Services, Inc. for Fred Webb, Inc. in 1990.

Seventeen pesticides were found at concentrations significantly elevated above background in groundwater at the Site. Pesticides were not detected in any of the background groundwater samples. The range of concentrations for the seventeen pesticides found in groundwater are as follows:

. Aldrin:	ND	-	0.98	ug/l
. Heptachlor:	ND	-	2.1	ug/l
. Heptachlor epoxide:	ND	-	0.49	ug/l
. Alpha-BHC:	ND	-	4.1	ug/l
. Beta-BHC:	ND	-	1.7	ug/l
. Gamma-BHC:	ND	-	8	ug/l
. Delta-BHC:	ND	-	10	ug/l
. Dieldrin:	ND	-	2.6	ug/l
. 4,4-DDT:	ND	-	4.6	ug/l
. 4,4-DDE:	ND	-	0.42	ug/l
. 4,4-DDD:	ND	-	13	ug/l
. Endrin:	ND	-	1.2	ug/l
. Endosulfan sulfate:	ND	-	0.21	ug/l
. Toxaphene:	ND	-	110	ug/l
. Gamma-chlordane:	ND	-	1.6	ug/l
. Alpha-chlordane:	ND	-	0.77	ug/l
. Endrin ketone:	ND	-	2.9	ug/l

The estimated areal extent of pesticides in groundwater is shown in Figure 5-2. Most of the significantly elevated pesticides concentrations in groundwater are limited to source areas 4 and 5. There is one isolated area within source area 2 (MW3-SH) that shows significantly elevated concentrations. The distribution of significantly elevated pesticides concentrations are limited mainly

to the upper 25 feet of the surficial aquifer. Only two pesticides, endosulfan sulfate (0.21 ug/l in MW7-DP) and aldrin (0.14 ug/l in MW8-DP) were measured at significantly elevated concentrations in the Yorktown aquifer.

Seven volatile organics were found at concentrations significantly elevated above background in groundwater at the site. Volatile organics were not detected in any of the background groundwater samples. The range of concentrations for the seven volatile organics found in groundwater are as follows:

. Chloroform:	ND	-	14	ug/l
. 1,2-Dichloroethane:	ND	-	35	ug/l
. 1,2-Dichloropropane:	ND	-	390	ug/l
. Benzene:	ND	-	830	ug/l
. Toluene:	ND	-	2200	ug/l
. Chlorobenzene:	ND	-	160	ug/l
. Total xylenes:	ND	-	3300	ug/l

The estimated areal extent of volatile organics in groundwater is shown in Figure 5-3. As indicated in this figure, most of the significantly elevated volatile organics concentrations in groundwater appear to be limited to source area 5. There is one isolated area within source area 4 that shows a significantly elevated concentration. The distribution of significantly elevated volatile organics concentrations appears to be limited mainly to the upper 25 feet of the surficial aquifer. Two VOCs, toluene andchlorobenzene (both at 2 ug/l in MW9-DP) were measured at significantly elevated concentrations in the Yorktown aquifer.

There were no volatile organics detected in the groundwater samples collected from the private wells.

Semi-Volatile Organics

Three semi-volatiles were found at concentrations above background in groundwater at the site. Semi-volatile organics were not detected in any of the background groundwater samples. The range of concentrations for the semi-volatile organics measured in groundwater are as follows:

. Bis(2-ethylhexyl)phthalate:	ND	-	68	ug/l
. Carbazole:	ND	-	10	ug/l
. Pentachlorophenol:	ND	-	78	ug/l

The estimated areal extent of semi-volatile organics in groundwater is shown in Figure 5-4. As indicated in this figure, significantly elevated semi-volatile organics concentrations in groundwater appear to be limited to two isolated areas within source area 5. There is one isolated area within source area 4 that shows an elevated concentration of semi volitale organics. The distribution of significantly elevated semi-volatile organics concentrations appears to be limited mainly to the upper 25 feet of the surficial aquifer. Only one significantly elevated concentration of bis(2ethylhexyl)phthalate (68 ug/l in MW5-DP) was measured in the Yorktown aquifer.

There were no semi-volatile organics of concern detected in the groundwater samples collected from the private wells.

Metals

Five metals were found at concentrations significantly elevated above background in groundwater. These five metals and their range ofconcentrations identified in groundwater are as follows:

. Beryllium:	ND	-	21	ug/l
. Nickel:	ND	-	140	ug/l
. Zinc:	15	-	370	ug/l
. Mercury:	ND	-	2.8	ug/l
. Manganese:	25	-	9500	ug/l

The estimated extent of metals concentrations greater than 2 times background in groundwater is shown in Figure 3-5. As indicated in this figure, most of the significantly elevated metals concentrations in groundwater appear to be limited to source areas 4 and 5. There are also two isolated areas within source areas 1 and 3 that show significantly elevated concentrations. The distribution of significantly elevated metals concentrations appears to be limited mainly to the upper 25 feet of the surficial aquifer. Only manganese (5900 ug/l in MW4-DP) was measured at a significantly elevated concentration in the Yorktown aquifer.

Two of the private wells sampled during the field investigation (PW01 and PW03) contained significantly elevated concentrations of zinc. The source of the zinc concentrations remain unknown. For this reason, the private well analytical data was not used in this study to help estimate the extent of metals contamination in groundwater.

C. Surface Water Investigation

Samples of surface water were to be collected both on-site and offsite to determine and evaluate surface water contaminant migration pathways and the extent and magnitude of surface water contamination with regard to each of the source areas identified at the site. Surface water is

only present on site during rainfall events. There was no surface water at any of the nine sample locations at the time of sampling. Because the presence of surface water is seasonal and corresponds to rainfall events, the remediation of onsite surface water will be addressed through the selected treatment remedy for soils/sediments. To assess the surface water condition in the wetlands, the "porehole" method was used to collect three surface water samples. This method involved digging an approximate 2-foot deep hole at the sample location, letting water seep into the hole, and filling the sample bottles directly from the hole. The surface water sampling locations are shown in Figure 5-6. Surface water samples were collected at the three wetlands locations (SW07, SW08, and SW09).

None of the seventeen pesticides identified on-site were detected in the three surface water samples collected in the wetlands. Based on these findings it was determined that pesticides contamination is not a problem in the surface water of the wetlands near the site. The only volatile organic detected in the wetlands was toluene, which was detected at one location (SW09) at a concentration of 5 ug/l.

No semi volatiles were detected in the samples collected in the wetlands. Semi-volatile organics contamination is not a problem in the wetlands at the site.

Four metals were detected in surface water samples collected in the wetlands. The range of concentrations for these four metals identified in surface water are as follows:

. Lead:	8	-	35	ug/l
. Zinc:	24	-	62	ug/l
. Mercury:	ND	-	0.31	ug/l
. Manganese:	160	-	1400	ug/l

VI. SUMMARY OF SITE RISKS

The FCX Washington Site is releasing contaminants into the environment. The Baseline Risk Assessment Report presents the results of a comprehensive risk assessment that addresses the potential threats to public health and the environment posed by the Site under current and future conditions,assuming that no remedial actions take place, and that no restrictions are placed on future use of the Site. The Baseline Risk Assessment being summarized in this section considered the Site risks associated with the groundwater only. The Site risks associated with the soils and air pathways will be presented in OU2.

The Baseline Risk Assessment Report consists of the following sections: identification of chemicals of potential concern; toxicity assessment; human exposure assessment, risk characterization; and environmental assessment. All sections are summarized below.

A. Contaminants of Concern

Data collected during the RI was reviewed and evaluated to determine the contaminants of concern at the Site which are most likely to pose risks to the public health. These contaminants were chosen for each environmental media sampled.

Once these contaminants of concern were identified, exposure concentrations in each media were estimated. Exposure point concentrations were calculated for groundwater using the lesser of the 95 percent upper confidence limit concentration or the maximum detected value as the reasonable maximum exposure (RME) point concentration. Exposure point concentrations for groundwater are shown in Table 6-1.

B. Exposure Assessment

The exposure assessment evaluates and identifies complete pathways of exposure to human population on or near the Site. Current and future exposure scenarios include ingestion of groundwater; and inhalation of volatiles evolved from groundwater during household water use. Further detail and mathematical calculations can be reviewed in the Baseline Risk Assessment. Table 6-2 provides the exposure assumptions that were used in the BRA.

C. Toxicity Assessment

Under current EPA guidelines, the likelihood of adverse effects occurring in humans from carcinogens and noncarcinogens are considered separately. These are discussed below. Tables 6-3 and 6-4 summarize the carcinogenic and noncarcinogenic toxicity criteria for the contaminants of concern.

Cancer slope factors (CSFs) have been developed by EPA for estimating excess lifetime cancer risk associated with exposure to potentially carcinogenic chemicals. CSFs, which are expressed in units of (mg/Kg-day)[-1], are multiplied by the estimated intake dose of a potential carcinogen, in mg/kg-day, to provide an upperbound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upperbound" reflects the conservative estimate of the risks calculated from the slope factor. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

Reference Doses (RfDs) have been developed by EPA for indication of the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of acceptable lifetime daily exposure levels for humans, including sensitive individuals. Estimated intake dose of chemicals from environmental media can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied. These uncertainty factors help ensure that theRfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

In the case of lead, EPA recommends the use of the Agency's Uptake Biokinetic model which predicts blood-lead levels for children ages 0.5-7 years under various exposure scenarios and lead concentrations.

D. Risk Characterization

The risk characterization step of the baseline risk assessment process integrates the toxicity and exposure assessments into quantitative and qualitative expressions of risk. The output of this process is a characterization of the Site-related potential noncarcinogenic and carcinogenic health effects.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ), or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose. By adding the HQs for all contaminants within a medium or across all media to which a given population may be reasonably exposed, the hazard Index (HI) can be generated. Calculation of a HI in excess of unity indicates the potential for adverse health effects. Indices greater than one will be generated anytime intake for any of the chemicals of concern exceeds its Reference Dose (RfD). However, given a sufficient number of chemicals under consideration, it is also possible to generate a HI greater than one even if none of the individual chemical intakes exceeds their respective RfDs.

Carcinogenic risk is expressed as a probability of developing cancer as a result of lifetime exposure to a cintaminant concentration in a given medium. Excess lifetime cancer risks are determined by multiplying the intake level with the cancer potency factor. EPA's acceptable target range for carcinogenic risk is one-in-ten-thousand (1E-4) to one-in-one-million (1E-6). Neither a cancer slope factor nor a reference dose is available for lead. Instead, blood lead concentrations have been accepted as the best measure of exposure to lead. The EPA has developed a biokinetic/uptake model to assess chronic and nonchronic exposure of children to lead. The uptake/biokinetic model estimates total lead uptake resulting from diet, inhalation, and ingestion of soil/dust, water, paint, and placental transport to the fetus. The uptake/biokinetic model calculates the uptake and blood lead levels for the most sensitive population, children ages 0 to 6 years old. EPA uses a blood lead level of 10 micrograms per deciliter (ug/dl) as the benchmark to evaluate lead exposure.

Current use

Ingestion exposure to groundwater obtained from private well one (PW01) constitutes the only complete exposure pathway for the current use scenario. PW01 located in source Area 3, is no longer used as a drinking water source. The exposure and risk calculations were made as a measure of the risks which would be incurred if the well was used as a drinking water source. Risks to a child resident due to ingestion of water from PW01 are presented in Table 6-5. Noncancer health effects are possible based on a measured HI of 1.12. None of the constituents which were detected is a carcinogen; therefore, calculation of cancer risk due to ingestion of water from PW01 is not necessary.

Risks to an adult resident due to ingestion of water from PW01 are presented in Table 6-5. Noncancer health effects are not expected based upon a measured HI of 0.27. Calculation of cancer risk is not applicable.

Future Use

The future use scenario considers the possibility that water supply wells may be installed in the contaminant plume. Consumption of water from the contaminated plume would result in an unacceptable risk to human health and environment. The shallow (water table) aquifer and the deep (Yorktown) aquifer are considered separately.

Contaminant Risk

The quantified carcinogenic risk and non-carcinogenic hazard indices for each aquifer is given in Table 6-6 and Table 6-7.

E. Environmental Assessment

Contact with or ingestion of contaminated surface waters are possible exposure routes at this site. The elevated chemical levels in surface waters indicate that these chemicals may have a potential impact upon terrestrial and aquatic organisms.

The results of the ecological sampling in the adjacent wetlands are discussed in the RI report. Dry conditions at the time of the sampling limited the scope of the investigation. Based only on one site sample compared to a background sample, a small impact on the benthic community in the study area was identified. Fish tissue analyses indicate that higher levels of DDD, DDE, and DDT are present in fish collected from the study site. All of the observed tissue concentrations (0.38-0.48 mg/kg) are well below the FDA Action Levels for DDT in fish of 5.0 mg/kg (USEPA, 1980a).

Although species diversity and equitability measurements of the macroinvertebrate communities at stream stations downgradient of the site are generally less than those of the control stream stations, both benthic communities appear to be healthy in terms of diversity and indicative of good water quality.

F. Conclusions

Actual or threatened releases of hazardous substances from thisSite if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

VII. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

Section 121(d) of CERCLA, as amended by SARA, requires that remedial actions comply with requirements or standards set forth under Federal and State environmental laws. The requirements that must be complied with are those that are applicable or relevant and appropriate to the (1) potential remedial actions, (2) location, and (3) media-specific chemicals at the Site.

Applicable requirements are those requirements specific to the hazardous substance, location, and/or contemplated remedial action, that are, or will be, related to the Site. These requirements would have to be met under any circumstance. Relevant and appropriate requirements are those requirements that address problems or situations sufficiently similar to those encountered at the Site, so that their use is well suited to the Site, but for which the jurisdictional prerequisites have not been met.

This Section examines the cleanup criteria associated with the contaminants found and the environmental media contaminated.

A. Action-Specific ARARs

Action-specific ARARs are technology-based, establishing performance, design, or other similar action-specific controls or regulations on activities related to the management of hazardous substances or pollutants. Potential action-specific ARARs are presented in Table 7-1.

B. Location-Specific ARARs

Location-specific ARARs are design requirements or activity restrictions based on the geographical or physical positions of the Site and its surrounding area. Potential location-specific ARARs are presented in Table 7-2.

Federal classification guidelines for groundwater are as follows:

- Class I: Groundwater that is irreplaceable with no alternative source or is ecologically vital;

- Class II: A - Groundwater currently used for drinking water;
  B - Groundwater potentially available for drinking water;

- Class III: A - Groundwater not considered Class IIA. State classification guidelines are based on best usage (NCAC 2L.0201). Under the State system

the aquifer is considered Class GA groundwater, existing or potential source of drinking water supply for humans under the state system.

C. Chemical-Specific ARARs

Chemical-specific ARARs include those laws and regulations governing the release of materials possessing certain chemical or physical characteristics, or containing specified chemical compounds. These requirements generally set health or risk-based concentration limits or discharge limitations in various environmental media for specific hazardous substances, contaminants, and pollutants. Potential chemical-specific ARARs are listed in Table 7-3.

VIII. REMEDIAL ACTION OBJECTIVES

A. Groundwater

Based on the results of the RI, the baseline risk assessment and considering the requirements for risk reduction, risk-based remediation levels, and the ARARs, the remedial action objectives specifically developed for groundwater at the site are presented in Table 8-1. The objectives in establishing the remediation levels were:

- Prevent migration of contaminants to surface water that would result in contamination to levels greater that the Ambient Water Quality Criteria (AWQC).

- Control future releases of contaminants to ensure protection of human health and the environment (SARA Section 121[d]).

- Permanently and significantly reduce mobility, toxicity, or volume of characteristic hazardous waste with treatment (SARA Section 121[d])

The final remediation levels, presented in Table 8-1, were selected as the most conservative of the federal and state chemical-specific ARARs, and if a standard did not exist, the risk-based goals. However, the average background concentration was selected as the remediation level if it exceeded the most conservative level.

B. Extent of Contamination Above Remediation Levels

The chemical groups found above the remediation levels in groundwater are pesticides, volatile organics, semi-volatile organics, and metals. The approximate locations of the contaminant plumes for each of the chemical groups are shown in Figures 8-1, 8-2, 8-3, and 8-4, respectively. The total extent of groundwater contamination is a summation of the contaminant plumes for each of the four chemical groups. The estimated volumes of groundwater contamination above remediation levels for each contaminant group are presented in Table 8-2. The semi-volatile and volatile organics contamination extends vertically through the upper 20 and 30 feet, respectively. Pesticides and metals contamination extends through the upper 40 and 50 feet, respectively.

IX. DESCRIPTION OF ALTERNATIVES

Table 9-1 summarizes the technologies considered for remediating the groundwater contamination, at the FCX Washington Site. The table also provides the rationale as to why certain technologies were not retained for further consideration after the initial screening.

A. Remedial Alternatives to Address Groundwater Contamination

The following alternatives were developed to address groundwater contamination at the Site:

Alternative 1: No Action

Alternative 2: Limited Action
Deed recordation
Long-term groundwater monitoring

Alternative 3: Groundwater Extraction/Onsite Treatment
Discharge to Surface Water

The remedial response actions to address groundwater contamination are discussed below.

Alternative 1: No Action

This alternative provides the baseline case for comparing remedial actions for groundwater and the level of improvement achieved. The only actions included in this alternative are groundwater sampling and analysis of the existing wells, and a data review every 5 years for 30 years. All samples would be collected and analyzed for the contaminants of concern.

There are no capital costs associated with this alternative. Operating costs are based on the review of Site conditions every five years. There would be no maintenance costs.

Total Capital Costs	$0
Present Worth O & M Costs	$142,635
Total Present Worth Costs	$142,635

Alternative 2: Limited Action

described above except that it includes implementation of institutional controls. The Agency will request that the State implement deed recordation to control, limit, and monitor activities onsite.

Total Capital Costs	$0
Present Worth O & M Costs	$142,635
Total Present Worth Costs	$142,635

Alternative 3: Groundwater Pumping/Onsite Treatment/Discharge to Surface Water

This alternative includes extraction of the contaminated groundwater, VOC removal using air stripping, metals removal using precipitation and ion exchange, carbon adsorption for the removal of organics, and discharge of the treated effluent to surface water.

Groundwater monitoring on at least an annual basis would be required to evaluate remediation as it progresses so that timely adjustments can be made, if determined appropriate. A period of 30 years is assumed for complete remediation.

If an offsite discharge option is selected the treated effluent would meet the surface water discharge criteria of the NPDES permit that would be obtained during the remedial design phase. The groundwater system will be designed to operate 24 hours per day. System controls would allow for complete automatic operation with minimal operator attention. Alarms and switches would be furnished for fail-safe operation.

For costing purposes, it is assumed that all treatment equipment would be leased. To the extent possible, major equipment would be furnished skid-mounted and complete with all piping and controls mounted on structural steel support skids. Also assumed for costing purposes, that air quality control equipment will be needed to capture volatile organics released from the air stripper and that the sludge produced from the metals precipitation process and spent carbon would be disposed of at a RCRA approved hazardous waste landfill facility.

Total Capital Costs	$ 3,367,813
Present Worth O & M Costs	$ 9,115,079
Total Present Worth Costs	$12,482,892

X. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The remedial alternatives to address groundwater contamination were evaluated using the nine evaluation criteria as set forth in the NCP, 40 CFR 300.430(e)(9). A brief description of each of the nine evaluation criteria is provided below.

THRESHOLD CRITERIA

1. Overall Protection of Human Health and the Environment addresses how an alternative as a whole will protect human health and the environment. This includes an assessment of how the public health and the environmental risks are properly eliminated, reduced, or controlled through treatment, engineering controls, or controls placed on the property to restrict access and (future) development. Deed restrictions are examples of controls to restrict development.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) addresses whether or not a remedy complies with all state and federal environmental and public health laws and requirements that apply or are relevant and appropriate to the conditions and cleanup options at a specific site. If an ARAR cannot be met, the analysis of the alternative must provide the grounds for invoking a statutory waiver.

PRIMARY BALANCING CRITERIA

3. Long-term Effectiveness and Permanence refers to the ability of an alternative to maintain reliable protection of human health and the environment over time once the cleanup levels have been met.

4. Reduction of Toxicity, Mobility, and Volume are the three principal measures of the overall performance of an alternative. The 1986 amendments to the Superfund statute emphasize that, whenever possible, EPA should select a remedy that uses a treatment process to permanently reduce the level of toxicity of contaminants at the site; the spread of contaminants away from the source of contaminants; and the volume, or amount, of contamination at the Site.

5. Short-term Effectiveness refers to the likelihood of adverse impacts on human health or the environment that may be posed during the construction and implementation of an alternative until cleanup levels are achieved.

6. Implementability refers to the technical and administrative feasibility of an alternative,

including the availability of materials and services needed to implement the alternative.

7. Cost includes the capital (up-front) cost of implementing an alternative, as well as the cost of operating and maintaining the alternative over the long-term, and the net present worth of both the capital and operation and maintenance costs.

MODIFYING CRITERIA

8. State Acceptance addresses whether, based on its review of the RI/FS and Proposed Plan, the State concurs with, opposes, or has no comments on the alternative EPA is proposing as the remedy for the Site.

9. Community Acceptance addresses whether the public concurs with EPA's proposed plan. Community acceptance of this proposed plan will be evaluated based on comments received at the public meetings and during the public comment period. These evaluation criteria relate directly to requirements in Section 121 of CERCLA, 42 USC Section 9621, which determine the overall feasibility and acceptability of the remedy. Threshold criteria must be satisfied in order for a remedy to be eligible for selection. Primary balancing criteria are used to weigh major trade-offs between remedies. State and community acceptance are modifying criteria formally taken into account after public comment is received on the proposed plan. Table 10-1 provides a summary of all the alternatives. The evaluation of the potential remedial alternatives to address groundwater were developed as follows.

A. Groundwater Remediation

The following alternatives were subjected to detailed analysis for groundwater remediation:

Alternative 1: No Action

Alternative 2: Limited Action

Alternative 3: Groundwater Pumping/Onsite Treatment
Discharge to Surface Water

Overall Protection of Human Health and the Environment

Each alternative was evaluated to determine whether it is likely to effectively mitigate and minimize the long-term risk of harm to public health and the environment currently presented at the Site. Alternative 1 does not eliminate any exposure pathways or reduce the level of risk. Alternative 2 eliminates some exposure pathways, with a reduction in the potential risk of groundwater ingestion and inhalation. The exposure pathways associated with continued contaminant migration in groundwater and through surface water discharge would not be eliminated. Alternative 3 eliminates exposure pathways and it is expected that any potential risk of ingestion or inhalation would also be greatly reduced as long as the system is in operation.

Compliance With ARARs

The no action and the limited action alternatives would not comply with ARARs. Alternative 3 would attain ARARs at the entire Site. Tables 7-1 thru 7-3 identifies the regulations pertaining to these alternatives.

Long-term Effectiveness and Permanence

In Alternatives 1 and 2, contaminant migration through groundwater and surface water discharge would continue. In Alternative 3, there would be a maximum reduction in pathway exposure risk, and furthet migration would be eliminated.

Reduction of Toxicity, Mobility, and Volume

Alternatives 1 and 2 would not reduce the toxicity, mobility, or volume (T/M/V) of the contaminants. Alternative 3 provides the maximum reduction of T/M/V.

Short-term Effectiveness

All of the alternatives can be implemented without significant risks to the community or on-site workers and without adverse environmental impacts.

Implementability

Alternative 2, requiring deed restrictions presents no implementability problems. Alternative 3 would require a NPDES permit if the treated effluent is discharged to Kenndy Creek. If Mount Pleasant Canal is selected for discharge, substantive compliance will be adequate.

Cost

Total present worth costs for the groundwater alternatives are presented in Table 10-1.

XI. THE SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of the alternatives and public and state comments, EPA has selected Alternative 3, groundwater pump and treat, as the remedy for thisSite. At the completion of this remedy, the risk associated with this Site has been calculated to be within the accepted risk range determined to be protective of human health and the environment. The total present worth of the selected remedy is $12,482,892.00. See Tables 11-1 for the detailed cost estimate.

A. Groundwater Remediation

Groundwater remediation will involve the extraction of the contaminated groundwater at the Site via extraction wells. The contaminated groundwater will be treated and discharged to surface water.

The treatment will consist of air stripping to remove volatile organics, precipitation and ion exchange for the removal of metals, and carbon adsorption to remove organics.

The groundwater system will operate 24 hours per day. System controls will allow complete automatic operation with minimal operator attention. Long-term monitoring for cleanup verification purposes and to track contaminant plume migration will be required. The system is expected to operate 30 years; samples will be collected from existing wells on a quarterly basis for the first 5 years, and on an annual basis for the following 25 years.

The groundwater treatment system will also require monitoring and maintenance. Monitoring of the treatment system will include periodic sampling of the influent and effluent from the treatment system and analysis in accordance with the permit requirements. Although dioxin contamination is not expected, the groundwater will be sampled for dioxin during Remedial Design stage. If dioxin is found the selected remedy will be modified to address any dioxin problem.

B. Extraction and Performance Standards

Location of extraction wells and pumping rates will be determinedduring the remedial design.

Final discharge will be to surface water. Discharge standards will meet the requirements of the NPDES permit, which will be defined during the development of the Remedial Design.

Groundwater shall be treated until the Remediation Objectives listed in Table 8-1 are attained throughout the contaminant plume.

The goal of this remedial action is to restore the groundwater to its beneficial use, as defined in Section 6.0. Based on information obtained during the RI, and the analysis of all remedial alternatives, EPA and the State of North Carolina believe that the selected remedy may be able to achieve this goal.

Groundwater contamination may be especially persistent in the immediate vicinity of the contaminants' source, where concentrations are relatively high. The ability to achieve remediation levels at all points throughout the area of attainment, or plume, cannot be determined until the extraction system has been implemented, modified, as necessary, and plume response monitored over time.

If the selected remedy cannot meet the specified performance standards, at any or all of the monitoring points during implementation, the contingency measures and goals described in this section may replace the selected remedy and goals for these portions of the plume. Such contingency measures will, at a minimum, prevent further migration of the plume and include a combination of containment technologies and institutional controls. These measures are considered to be protective of human health and the environment, and are technically practicable under the corresponding circumstances.

The selected remedy will include groundwater extraction for an estimated period of 30 years, during which time the system's performance will be carefully monitored on a regular basis and adjusted as warranted by the performance data collected during operation. Modifications may include any or all of the following:

a) at individual wells where remediation levels have been attained, pumping may be discontinued;

b) alternating pumping at wells to eliminate stagnation points;

c) pulse pumping to allow aquifer equilibration and encourage adsorbed contaminants to partition into groundwater;

d) installation of additional extraction wells to facilitate or accelerate cleanup of the contaminant plume.

To ensure that cleanup continues to be maintained, the aquifer will be monitored at those wells where pumping has ceased on an occurrence of at least every 2 years following discontinuation of groundwater extraction.

If it is determined, on the basis of the preceding criteria and the system performance data, that certain portions of the aquifer cannot be restored to their beneficial use, all of the following measures involving longterm management may occur, for an indefinite period of time, as a modification of the existing system:

a) engineering controls such as physical barriers, or long-term gradient control provided by low level pumping, as contaminant measure;

b) chemical-specific ARARs may be waived for the cleanup of those portions of the aquifer based on the technical impracticability of achieving further contaminant reduction;

c) institutional controls may be provided/maintained to restrict access to those portions of the aquifer which remain above remediation levels;

d) continued monitoring of specified wells; and

e) periodic reevaluation of remedial technologies for groundwater restoration. The decision to invoke any or all of these measures may be made during a periodic review of the remedial action, which will occur at 5 year intervals in accordance with CERCLA Section 121(c).

The remedial actions shall comply with all ARARs (See Sections VII).

RESPONSIVENESS SUMMARY

FCX WASHINGTON GROUNDWATER CONTAMINATION SITE
WASHINGTON, NORTH CAROLINA

Responsiveness Summary Overview

The Responsiveness Summary is the official record of how the Agency responded to public comments as a part of the decision making process. The responsiveness summary also provides the decision makers of the lead Agency with the public's views, so that they are considered in the final decision.

This document is segregated into three components; summary of the community's involvement, the Agency's response to comments received at the proposed plan public meeting and the Agency's response to written comments received from concern parties during the process.

Background of Community Involvement and Concerns

The public concerns regarding this Site have been minimal. This is probably the result of the Agency's rather extensive community relations efforts, and the fact that the removal action conducted at the Site removed the primary threat.

Two public meetings were held. The first meeting on October 3, 1991 was the introduction of the Superfund process, and the second meeting was the proposed plan meeting on May 4, 1993. Several fact sheets were prepared and distributed through out the process. The Remedial Investigation (RI) and Feasibility Study (FS) reports along with the Proposed Plan were released to the public in April 1993. All of these documents as well as the Administrative Record were made available to the public via the Brown Library, in Washington, North Carolina. Announcements of each meeting were advertised in the local newspaper and press releases prepared.

Public Meeting Comments

These are the community concerns that were expressed as a result of the May 4, 1993 proposed plan public meeting are as follows:

Comments: A gentleman inquired if the FCX declared bankruptcy in anticipation of the huge cleanup cost associated with the Site.

Response: We really don't know the reason bankruptcy was declared. We were made aware of the proceedings at the latter stage of the process and were able to retain 2.5 million dollars of their assets, for the cleanup at the FCX Statesville and Washington Sites.

Comments: What is the total cost of the projected cleanup?

Response: The approximate cost including previously incurred cost is about $19,000,000.00

Comments: How far has the contamination migrated? and how many wells are there at the Site to show movement of the plume?

Response: EPA installed eighteen wells that look at the surfical and the Yorktown aquifers. The contamination is still within the boundary of the Site.

Comments: What would the future deed restrictions entail?

Response: The restriction would seek to restrict the use of the groundwater until it was restored to useable condition. The removal and treatment of the contaminated soil will restore the soils so that the property can have unrestricted use.

Comments: Is it safe to eat at Charlie Toms Restaurant given it's close proximity to the Site?

Response: The pesticides are not especially volatile and require that they be airborne via blowing dust to cause a problem. However, the cleanup standards selected will render the Site safe for public use even in the event of airborne dust. The results of sampling conducted in the interior of Charlie Toms Restaurant were within EPA's acceptable risk range.

Comments: Will the treated groundwater have to meet a minimum contaminant level before it can be discharged.

Response: Yes.

Comments: When will the groundwater remediation action begin, and how long will it take?

Response: It will probably be a year to a year and a half before the remedial action begins, and take anywhere from 15-30 years to complete.

Comments: Does the Agency anticipate any movement of the contaminated groundwater in that time?

Response: We anticipate some movement, but the extent of contamination will be re-evaluated to compensate for any such movement at the time of remedial action.

Comments: Is there an estimate of the amount of the discharge for the NPDES permit?

Response: We estimate it to be approximately 20 million gallons.

Comments: Thirty three million dollars is a lot of money to spend on this one small Site. Couldn't the contaminated soil be diluted by spreading the soil on other farms where people would be willing to accept the soil, or could these soils be repackaged with other pesticides? There are probably unacceptable levels of pesticides on farms all over the Washington area.

Response: One major problem with that idea is DDT, DDE and Lindane are banned pesticides, and legally these things cannot be done.

Comments: Has the contamination reached the Castle Hayne Aquifer?

Response: The Remedial Investigation did not address the Castle Haynes. We don't believe the Castle Hayne has been affected.

Comments: Your slides didn't give the overall volume of soil present at the site.

Response: We surveyed the stockpile and counted the bags and estimated we have 14,700 cubic yards of contaminated soil, give or take five to ten percent.

Comments: Who monitors the contractor and evaluates his performance?

Response: The on-scene coordinator will perform that duty.

Comments: What will be the limitation on the soils being used for fill material after remediation?

Response: Because of perception the soil won't be sold by the truckload at the Site. But it will probably be made available for the city's public works department.

Comments: Given the fact that farmers apply these pesticides year after year because they lose their strength. How long would we have to wait for this stuff to become harmless if we did nothing?

Response: The half-life for chlordane pesticides is eighteen years, and that half-life depends on several variables such as the presence of oxygen, etc. That does not mean the Site will be safe enough for people to be in direct contact with the contaminated soil.

Comments: We were discussing the movement of the groundwater and you assured us that contamination had not migrated very far. The Latham residence is very close, how is it impacted?

Response: The groundwater is flowing away from the Latham residence, however, their well was primarily contaminated with metals and only one of the seventeen pesticides present on Site. The probable source is from the over land flow from the warehouse along the drainage ditch.
Comments: What if it doesn't work.

Response: It depends on why it doesn't work, but we would re bid the job if there is a problem with the unit or the vendor. If the technology is not adequate another public meeting will be held and another alternative selected.

Written Comments Received During the Public Comment Period

Comments: There was one letter submitted in response to the Proposed Plan Public Meeting. Serious concern was expressed over the amount of money to be spent at this Site, and that fifteen to twenty million dollars is too much money to spend to improve one person's risk of developing cancer. The letter expressed an overall disagreement with the risk assessment process, and how overall risk is determined. The author believes that Alternative 2, limited action would be the best alternative. The author is also at odds with the decision to use thermal desorption to address the soil contamination. It is his belief that the waste can be shipped off-site to a salt mine for back fill. He is certain that the contamination won't ever escape from the salt formations, and all this can be done at a considerable cost savings.

Response: Regulatory requirements will not allow the landfilling of these contaminants outside an approved RCRA landfill.

Comments: The Pamlico-Tar River Foundation forwarded a letter to the Agency in support of the actions taken at the Site. The letter also expressed concern over the potential threat posed by the old city dump located in the wetlands behind the Site, and the fact that actions taken at the FCX Site don't encompass the old city dump.

Response: The city dump will have to be considered as separate site and would have to be proposed for the National Priority List before EPA could become involved.

State of North Carolina
Department of Environment, Health, and Natural Resources
512 North Salisbury Street Raleigh, North Carolina 27604

James B. Hunt, Jr., Governor

Division of Solid Waste Management
Telephone 919-733-2801

Jonathan B. Howes, Secretary

September 13, 1993

Mr. Michael Townsend
Remedial Project Manager
US EPA Region IV
345 Courtland Street, NE
Atlanta, GA 30365

RE: State Concurrence with the Draft Record of Decision Operable Unit 1, Groundwater FCX Washington NPL Site Washington, Beaufort County, NC NCD 981 475 932

Dear Mr. Townsend:

The State of North Carolina has reviewed the Draft Record of Decision for the FCX Washington Site and concurs with the selected remedy, subject to the following conditions.

1. State concurrence on this Draft Record of Decision (ROD) and the selected remedy for the site is based solely on the information contained in the Draft Record of Decision dated June 1993. Should the State receive new or additional information which significantly affects the conclusions or remedy selection contained in the ROD, it may modify or withdraw this concurrence with written notice to EPA Region IV.

2. State concurrence on this Draft ROD in no way binds the State to concur in future decisions or commits the States to participate, financially or otherwise, in the clean up of the site. The State reserves the right to review, overview, comment, and make independent assessment of all future work relating to this site.

3. If, after remediation is complete, the total residual risk level exceeds 10[-6], the State may require deed recordation/restriction to document the presence of residual contamination and possibly limit future use of the property as specified in NCGS 130A-310.8.

4. It is our understanding that screening analysis of the groundwater at the subject site for dioxins/dibenzofurans will be performed during the remedial design.

If, PCDD's/PCDF's are determined to be present in groundwater at detectable levels, risk values as shown in Table 6-6 of the ROD and remedial action objectives for groundwater as noted in Table 8-1 must be recalculated and submitted for review. The granular activated carbon (GAC) system must also be designed based on PCDD's/PCDF's as contaminants of concern in the groundwater and GAC unit disposal methods may also change.

The State of North Carolina appreciates the opportunity to comment on the Draft Record of Decision for the subject site, and we look forward to working with EPA on the final remedy.

Sincerely,

Jack Butler, PE
Environmental Engineering Supervisor
Superfund Section

cc: Randy McElveen, NC Superfund Section
Bruce Nicholson, NC Superfund Section